Communicating Water Quality/Quantity Data to a Small Wisconsin Village Board in Time for Informed Decisions

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Biographical Sketch of Authors

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Abstract

A case study of Spring Green, Wisconsin during a critical time of rapid development, storm water flooding events, revelations of high groundwater conditions under a new development, and a municipal well contaminated with MtBE. How does a small village board cope with these pressing water issues, while repairing streets, replacing employees, managing two city parks, a wastewater treatment system for 1500 people, public library, senior center, long range planning issues, and a police department?

A few remarkable citizens stepped forward and dedicated much of their personal lives and sleepless nights to make sense of the information made available to them and to make decisions that would benefit their hometown. This is a story of real people, pressing forward and interpreting scientific information that often makes little common sense. It's remarkable how few mistakes were made, but there were some.

How can the Wisconsin new comprehensive planning or "smart growth" law help Spring Green and similar small towns anticipate approaching water issues and make more informed decisions? The authors of this paper look deep within a group of decision makers and cull the lessons learned, to form a set of expectations for better land use planning as it relates to water resource management.

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Village of Spring Green

Spring Green is nestled in the lower Wisconsin River valley a short 45 miles northwest of Madison the state capital. The southeastern corner of the village reaches the flood plain and the state owned protection zone of the Wild and Scenic River section of the Wisconsin River. The village is located in the southwestern corner of Sauk County at the intersection of STH 14 and 23. Surrounded by forested rolling hills, Spring Green is a quiet and prosperous town of just less than 1500 people and on the outer edge of rapid urbanization pressures from the City of Madison.

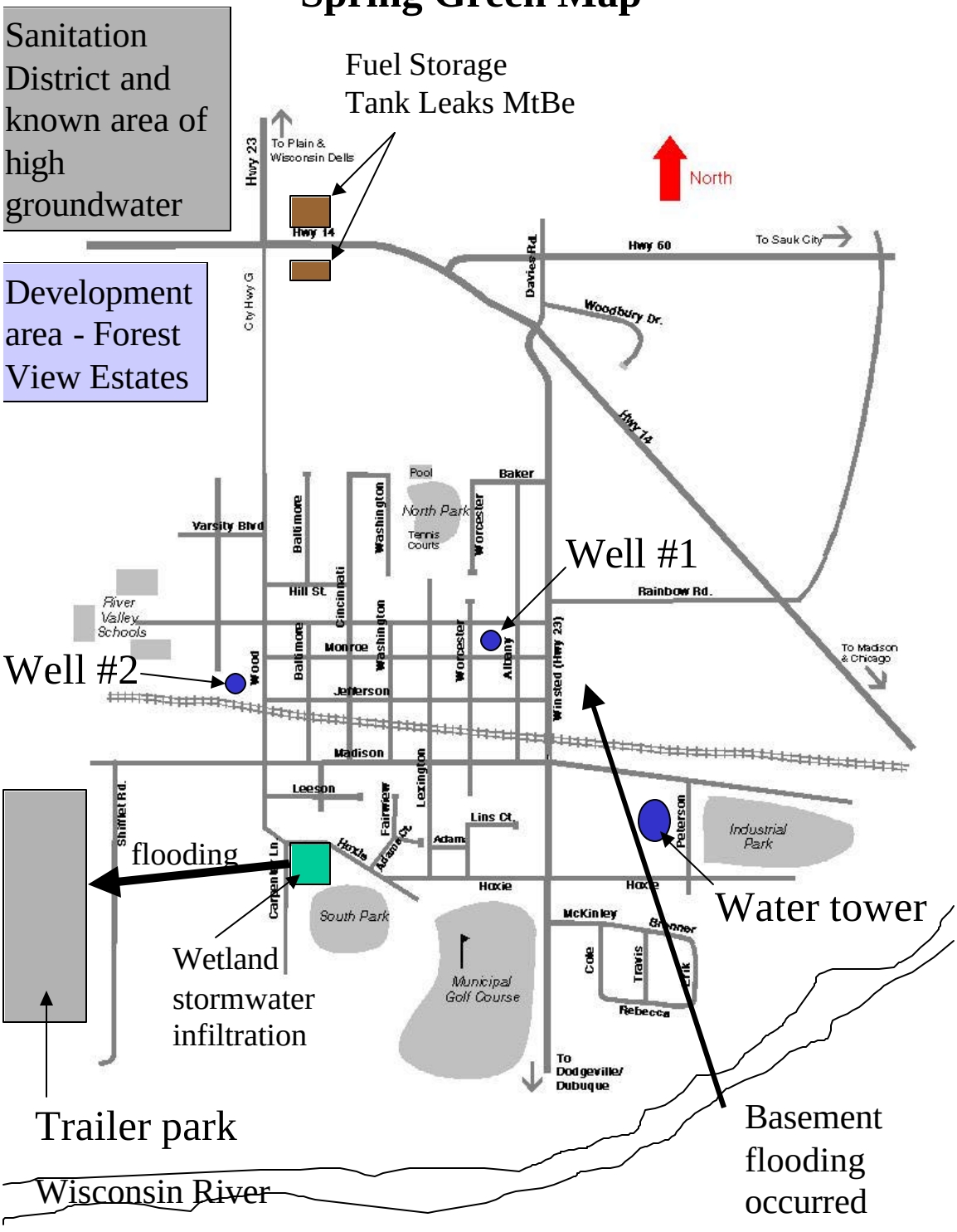
The village offers 1100 year round industrial jobs mainly associated with the construction industry. The Cardinal Glass Company CG and IG Divisions often run three shifts of workers, who tint, bend and temper glass panes that go into commercial and residential window frames. The Omni Futon Furniture Company manufactures beautiful futon covers, and the Richland Industries Company manufactures motor pistons and connecting rods. The Kraemer Company and Kraemer Brothers, Inc construction companies are located 7 miles north of Spring Green in the Village of Plain. They design and build roads, bridges and large buildings for offices, schools and prisons. Spring Green enjoys a strong and robust economic base throughout the year.

The local economy really booms people come to town to work seasonal summer jobs linked to the tourist industry. The American Player Theater (APT) has a national reputation for outdoors Shakespearean plays and seating for 1000 people who drive out from Madison or Chicago. Their five-month repertoire keeps the hotels full and restaurants humming. The Spring Country Club owned by the House on the Rock Corporation is across the road from APT and the actual House on the Rock is 6 miles south on STH 23.

One mile south of Spring Green is the world famous Frank Lloyd Wright's beloved architectural school he named Taliesin. Master architects of the school continue to teach 90 young apprentice architects from May to October of each year. They leave for Taliesin West in Arizona over the winter months and return the following spring. Mr. Wright initiated this migratory tradition to keep the young architects surrounded by landscapes that would stimulate creativity. Drifting snow must not be very motivational. The visitor's center attracts international tourists to Spring Green and Mr. Wright's historical importance continues to thrive in the village. He designed a community center for Spring Green just before his death in 1959, which he wanted to present to the Village at his 90th birthday as a thank you gift of appreciation for the celebration they held for his 89th birthday. He passed on too soon and the drawing was sent out to the drier climate of Arizona with other valuable drawings. It was rediscovered in 1999 and private organizations are attempting to raise funds to build his final design as the performing arts center in Spring Green. It would be one of Wrights last creative achievements to reach the reality of construction.

Downtown Spring Green has a few unique architectural features of its own. The M&I Bank designed by the Frank Lloyd Wright architects reflects his natural design principles. The Post House Restaurant is a county historical site and the oldest continuous eating establishment in Wisconsin (since 1857). The Flying Dutchmen Bar designed by Mr. Wright is located inside the restaurant. Local artists display their creative talents in shops near the quiet railroad line and the downtown Jefferson Street. A few freight trains use the track to carry coal to the University of Wisconsin power plant in Madison and a tourist train comes out from Middleton in the summer months to deliver history-loving tourists.

Spring Green Map



The Village of Spring Green has a healthy economy for a small town and provides a peaceful harmonious environment for young families to raise children. The consolidated school district buses junior and high school students in from Clyde, Lone Rock, Arena and Plain. Two Catholic Parochial Schools and four public elementary schools educate younger children closer to their homes. The River Valley School District has about 1200 students and offers a diverse curriculum that can prepare young people for college or the county trade schools. The crime rate is fairly low and when a crime does occur the perpetrator is usually caught. It's important to know your neighbors in Spring Green and to give something back to your hometown.

Spring Green has an artistic atmosphere with wonderful community theater performances in the winter months, a popular summer art fair, great live-music performances year round by the Rural Musicians Forum, partisan shops everywhere and a Bob Dillon look-alike concert at the General Store each winter to celebrate his birthday.

A 7-member Board of Trustees, a Village Administrator/Clerk/Treasurer and an assistant clerk govern the Village. It has three full-time police officers and one is the Chief Officer. The three member Public Works Department maintains the village streets, runs the Sewage Treatment Plant (STP), maintains the two drinking water wells, tower and distribution lines, along with the wastewater sewage lines. They mow grass in the summer months and plow snow in the winter.

Between 1996 and 1998 the citizens of Spring Green revised their Land Use Master Plan and expressed a strong desire to keep their hometown atmosphere intact, and maintain the quality of life they were currently experiencing. It was not an anti-growth statement because quality growth was encouraged.

The Troubles

Water quality troubles were relatively minor and routine in Spring Green until 1992 when leaking underground fuel storage tanks were discovered below one and eventually a second gasoline station located across from each other at the intersection of STH 14 and Wood Street. A large quantity of gasoline was pumped from the soil when the tanks were removed. The state hydrologist estimated methyl tert-butyl ether (MtBE), a component of reformulated gasoline which moves through the soil and into ground water more rapidly than other chemical compounds present in gasoline,[1] would reach the #2 wellhead about 10 years later. Low levels of MtBE were detected at the wellhead in 1996. MtBE clearly causes odor problems in drinking water, but the cancer risk from exposure to MtBE is substantially less than that for benzene, a minor component of gasoline that is classified as a known carcinogen.[2] The Village Board began negotiations with the Department of Commerce soon after that discovery and began learning much about the administration of Petroleum Environmental Cleanup Fund Act (PECFA) funds.

Well #2, drilled before MtBE contamination was discovered, is the newest of the two village wells and pumps the largest volume of water into the distribution system. The wellhead is 120 feet below the surface and over four thousand feet from the gasoline spills. The groundwater moves south towards the Wisconsin River and the gasoline moves downward as storm water percolates through the soil. Apparently the flume was going below the wellhead because the concentration never exceeded 2.5 ppb. The current US EPA action concentration for MtBE is 30 ppb, but the standard is under review. The Village Board voted to close down the well operation at 12 ppb to provide a margin of safety. Department of Commerce would not approve use of PECFA funds for a new well unless the EPA action concentration was exceeded. They continue to monitor the flume and spending PECFA funds. It would cost about $500K to build the new well north of the spill and the fund contained two million dollars initially. In 1999 three fourths of

[1] McCarthy, James E and Mary Tiemann 98-290: MTBE in Gasoline: Clean Air and Drinking Water Issues. Report for Congress by the National Council for Science and the Environment. Page 7.
[2] Ibid.

the funds were expended. Well #2 continues to pump low levels of MtBE into the community to this day.

The Spring Green plan commission began work aligning the Village Zoning Regulations with the new Master Plan early in 1999. Three members of the Board of Trustees serve on the plan commission. New public hearings were held and zoning regulation amendments were recommended to the Board of Trustees for final approval.

Unusually high rain events in 1999 were causing flood conditions along STH 23 and irate property owners were calling to complain to the Board of Trustees. The storm sewers were designed for a 25-year flood event and the Village was experiencing 50-year events on a regular basis. The flood conditions were amplified by a default village policy that encouraged property owners to drain driveways and parking lots into the street. Impervious surfaces were growing more prevalent in the downtown area. A large wave would form in the curb-to-curb rainwater pond whenever a large truck would pull out of the Village Industrial Park and drive up flooded STH 23 to Rainbow Avenue to reach STH 14. The truck drivers would wave at the frantic property owners who were trying desperately to push back the stormwater with brooms. Stormwater would cascade over the curb and flood into basement window wells. The phones kept ringing.

An opportunity to demonstrate appropriate stormwater management came to the Village Board in 1999 when the U.S. Postal Service requested replacement of their 1959 post office. The Board of Trustees decided to build the new post office for the Postal Service on a city-owned lot across the railroad track from the current post office. The Postal Service agreed to the installation of runoff infiltration beds, rooftop and parking lot runoff capture design features, and erosion control fencing during the construction phase. This would be the first application of the new stormwater ordinance requirements in the village and the first time citizens would see management methods applied to the control of stormwater runoff problems.

While this was coming about the developer for the proposed Forest View Estates entered into a series of meetings with the Village Plan Commission to obtain plat approval for a large residential (250 units) and commercial development northwest of the village in the extra-territorial jurisdictional zone. The new development would slide in just before the new zoning regulations were fully adopted. But the developer agreed to comparable stormwater management methods.

The plan commission reached agreement with the Forest View Estates developer and the consulting engineering firm on the plat application and recommended approval to the Board of Trustees. The developer agreed to the following important issues:

- Immediate annexation of the land into the village;
- Stormwater management plan that would meet or exceed EPA performance standards;
- A hike and bike pathway dedicated to the Village; and
- Willingness to construct a large sewage lift station near the intersection of Wood Street and STH 14.

The lift station would improve the gravity movement of sewage from the expected commercial development in Forest View Estates and from the existing homes and commercial property in the Prairie Sanitation District down to the Village STP.

While these negotiations occurred with the developer of Forest View Estates the village administrator was replaced twice and the public works director resigned. A robbery suspect totaled one of the two village patrol cans when he backed a rental truck over the hood of the vehicle pinning the officer inside. The pinned officer discharged his weapon into the truck cab door when it was flung open by the driver. The suspect surrendered and the officer was later placed on administrative leave until the Sauk County Sheriffs Department could review the incident. In addition, the assistant clerk retired, and Y2K concerns required replacement of four

old computers in the village office. All of these routine events required hours and hours of meetings to sort out the issues and to create reasonable decisions and fair public policy.

The phone calls continued in 2000 especially when an eleven-inch rain event flooded the village streets and the new post office construction site. The silt fencing around the post office diverted the rainwater nicely and the holes dug for the infiltration ponds trapped much of the eroding soil. The homes along STH 23 near Rainbow Avenue were not as fortunate. But one of the Public Works employees came to the rescue. He suggested adding a 6-inch speed pump at the foot of the driveways to keep back the cresting waves from truck traffic. The asphalt layer was placed across the driveway ramps and behold, the asphalt dams worked! Homeowners were satisfied, at least for the time being. The highway is scheduled for resurfacing in 2005 by the state and the village intends to double the stormwater drainage capacity while that work is being done and build a series of infiltration ponds by expanding the municipal golf course.

The developer of Forest View Estates looked forward to a productive construction season and began street and water line construction early in the summer of 2001. While constructing the sewage lift station the construction crew ran into high ground water. It was common knowledge that perched water was found in that area above hardpan clay soils, but in small, localized regions. Local residents thought you could dig through the hardpan and the water would percolate into the dominant alluvial sandy soils. The construction crew tried, but could not punch through. Pumps were brought in and a long above ground plastic pipe was extended down to the village storm sewer lines located in front of the River Valley High School. Pumping began in earnest.

Bob Holding reported in the Home News newspaper that a request to stop pumping water was made at the June 13 Board of Trustees meeting. Apparently, stormwater from the Forest View Estates construction site was overflowing the wetland infiltration zone near South Park and flowing out to Shifflet Road and flooding private property. The Forest View Estates developer reported to the Board of Trustees that the pumping system was capable of moving 8,800 gallons of water per minute and it would take about 20 days to lower the groundwater far enough for them to finish construction of the sewage lift station. To move that much water, a WI DNR discharge permit would be necessary because the overland flow would reach the Wisconsin River. The developer was ordered to stop pumping by the village contracted engineering firm when it became apparent the discharge permit would not be granted.

Members of the Board of Trustees also expressed concern for the MtBE flume that was located near the pumping zone. They were worried that the large volume of pumping could move the flume upward and cause more MtBE to reach the 120-foot depth of Well Head #2. The Forest View Estate construction work stopped soon after the June 27, 2001 meeting of the Board of Trustees.

Since then the developer has re-engineered his complete development plan. The large sewage lift station system idea was abandoned. Small individual sewage pumps will be installed at each home to move the sewage high enough to drain down hill to the Village STP. The new homeowners will pay extra for their home construction and will have maintenance costs associated with the individual lift stations some time in the future.

The Board of Trustees has approved the alternative sewage lift plan and work will resume on Forest View Estates this coming summer of 2002 after hours of extra meetings with the plan commission, additional frustration and engineering costs. What kind of information would have helped the Spring Green Village Board avoid these kinds of problems and to save the costs of re-engineering by the land developer and the public costs of ill-advised development?

The Solutions

When the Village of Spring Green decided to approve the plat for the Forest View Estates in 1999, they had completed the following planning steps.

- They had recently revised their Land Use Master Plan in 1996-1998 which identified preferred areas of development. The Forest View Estates proposal was in a preferred location for development according to the plan.
- They had zoning and subdivision ordinances in place.

Important questions about the plan include:

- What water quantity information and analysis was included in the plan including maps and historical data including groundwater, surface water and links between flooding and groundwater levels? Houses within the villages did not have cracking foundations, which can indicate high groundwater. Basements only became wet during flooding events. So high groundwater levels were not expected. High groundwater levels were recognized in the extraterritorial zoning area north of Highway 14.
- What goals and objectives did the plan provide for addressing the known MtBE groundwater contamination? The Village was in PECFA negotiations with the Wisconsin Department of Commerce and litigation prevented the Village from including MtBE contamination information in the plan.

Ideally, plans are developed first and then ordinances are used as one tool to implement the plan. After Spring Green adopted their new plan, they embarked on the journey to update their ordinances to be consistent with their plan. This is a crucial step to ensure plan implementation and legal defensibility. During this transition period when the plan had been adopted, but the ordinances were not yet revised, the Forest View Estates proposal was approved. The following questions about the ordinances at that time arise.

- What performance standards related to groundwater quality, quantity and depth were in place for annexation of lands in the extraterritorial area, plat approval and rezoning? For instance, the pumping capacity at a site could limit the areas usefulness for industries requiring high quantities of water.
- Were all of these standards followed by the decision-makers?

Since high groundwater was discovered in the Forest View Estates area, Sauk County, where Spring Green is located, obtained funding assistance from Wisconsin Department of Natural Resources and contracted with the Wisconsin Geologic and Natural History Survey to develop new groundwater maps. The Sauk County Land Conservation Department provided training to display and explain the uses of these maps for planners, resource agencies, municipalities and citizens.

In addition, the Village of Spring Green has updated their subdivision ordinance to state that the plan commission may require test wells as part of the application for a new plat. They have also incorporated drainage system requirements for new plats. The new groundwater maps and ordinance requirements will provide the Spring Green village plan commission with additional information about the depth to groundwater when they consider future plat approvals. Other options for consideration to ensure good knowledge of groundwater levels prior to approving development proposals include:

- Updating the Land Use Master Plan to include the new groundwater maps and related goals and objectives,
- Developing a record of all test well results to inform future decisions,
- Requiring the groundwater level to be recorded on all plat applications based on information from the groundwater maps from the Wisconsin Geologic and Natural History Survey. Based on the Village's assessment of the map's quality and reliability, they may choose to require test wells in areas of high groundwater or in all areas,

- Similarly, requiring the groundwater level to be recorded when applying to annex land into the Village or rezone land into a residential, commercial or industrial zoning district, and
- Using a temporary moratorium to stop development while ordinances are aligned to be consistent with new community plans.

A snapshot approach to planning which does not include historical information can lead to little understanding of trends and future issues. Planning is a proactive, forward thinking, continuous process. As a community learns more about its natural resources and the way those resources interact with other land uses, plans become more effective.

In conclusion, the Sauk County Land Conservation Department stated in a recent letter: "The wisdom in the saying *an ounce of prevention is worth a pound of cure* is so true where groundwater is concerned."